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**Patentanmeldung Nr. Patent application No. Demande de brevet n°**

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## Sonic tooth brush with multiple containers

The invention relates to an oral care system comprising a sonic power toothbrush which comprises a body, a brush member mounted on the body, a brush head which is carried by the brush member at its end remote from the body so as to be able to vibrate relative to the body, which brush head is provided with bristles and an additive outlet, an additive container connected with said additive outlet, driving means for generating sonic frequency vibrations and transmission means for transmitting said sonic frequency vibrations to the brush head.

10 An oral care system comprising a sonic power toothbrush of the type defined in the opening paragraph is known from EP 0565598 B1.

In the known oral care system, the sonic power toothbrush comprises a brush head which is carried by the brush member at its end remote from the body so as to be able to vibrate relative to the body. The toothbrush further comprises an additive container from which during operation an additive is transported to the additive outlet, here formed by a number of hollow bristles on the brush head. When the toothbrush is activated the brush head and the bristles provided there on are set into vibration by the driving means. The vibration of the brush head and the bristles is used to mechanically scrub the teeth. At the same time the vibration of the brush head provides sonic frequency vibrations which are sufficient to support cavitation and streaming throughout the oral cavity, including areas beyond the reach of the bristle contact area. The sonic frequency vibrations delivered by the toothbrush enhance the effect of an additive on the teeth and oral cavity, especially when this additive is a medicinal agent.

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It is an object of the invention to provide an improved oral care system comprising a sonic power toothbrush.

To achieve this object, an oral care system comprising a sonic power toothbrush according to the invention is characterized in that the system comprises at least

one further additive container. At least two different types of additives can thus be stored in the toothbrush. The user does not have to apply a first and a second additive manually to the brush head, since these additives are already incorporated into the toothbrush. This benefits the user friendliness of the device. The application of at least additives to the teeth is realised

5 in an effective manner by means of only one device, while the sonic frequency vibrations enhance the effect of the additives. This offers a large number of possibilities of use. During operation, for example, subsequent first and second additive flows from respectively the first and the second container to the additive outlet can take place. During the first additive flow, for example, a cleaning additive can be transported to the additive outlet in the brush head,

10 and then via this brush head be applied to the teeth. The cleaning additive adds to the cleaning effect of the scrubbing movement of the bristles, while the sonic frequency vibrations enhance the penetration of the cleaning additive into areas between the teeth. The second additive flow can, for example, comprise transport of an additive chosen from a group of additives for treatment and protection of the oral cavity and teeth, from the second

15 container to the additive outlet. The first and second additive flow can, for example, also take place simultaneously during operation. This is advantageous on cases where certain additives have a beneficial effect on teeth when applied in combination with each other, but cannot be stored together due to for example unwanted chemical reactions. The combined application of the additives to the teeth takes place in an effective manner since the mixing of the

20 additives during application to the teeth is enhanced by the sonic frequency vibrations .

An embodiment of an oral care system comprising a sonic power toothbrush according to the invention is characterized in that the tooth brush is provided with means for selection of a first and second additive flow. The user of the system can thus make a selection for an additive flow to be started up. This offers freedom of use, since the user for example

25 can determine whether all additive flows should take place, and can choose the order in which flows take place.

It is advantageous when said means comprise a switch positionable in a first and a second position corresponding to the first and the second additive flow.

It is further advantageous when an oral care system comprising a sonic power

30 toothbrush according to the invention comprises a processor for selecting and activating additive flows in the tooth brush. Depending on the type of additives being supplied by the toothbrush, it can be advantageous when the additive flows are selected automatically without influence of the user. The user then only starts up the brushing action of the tooth brush, while the processor further controls the additive transport. This is advantageous for



example when the additives are medicinal agents that are to be applied in a certain amount and order to have the correct effect on the teeth and oral cavity.

An embodiment of an oral care system comprising a sonic power toothbrush according to the invention is characterized in that the system comprises a charging holder in which the toothbrush can be placed for electrical charging, which holder is provided with a refill unit for refilling at least one of the containers when the toothbrush is placed in the holder. The tooth brush needs to be placed in the holder for electrical charging of its batteries after a certain period of use. When this holder is provided with a refill unit for refilling at least one of the containers, the period of inactivity of the tooth brush needed for recharge is further utilized for filling the container with an amount of additive that was used up during the preceding period of use.

It is advantageous when the refill unit comprises at least one tank connected with a pump unit, which pump unit is connectable via a coupling to at least one of the containers when the toothbrush is placed in the holder.

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The invention will be described in more detail hereinafter with reference to the drawings, in which

Figure 1 shows a perspective view of a first embodiment of an oral care system comprising a sonic power tooth brush according to the invention,

Figure 2 schematically shows the tooth brush of Figure 1 partly broken open,

Figure 3 schematically shows a second embodiment of an oral care system comprising a sonic power tooth brush according to the invention.

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Figure 1 shows a perspective view of a first embodiment of an oral care system 1 comprising a sonic power tooth brush 2 according to the invention. Said tooth brush 2 comprises a body 3 and a brush member 4 mounted on the body 3. Said brush member 4 carries at its end remote from the body 3 a brush head 5 mounted so as to be able to vibrate relative to the body 3, as described for example in EP 0565598 B1. Said brush head 5 is provided with bristles 6 and an additive outlet 7 which is shown in more detail in Figure 2. The brush member 4 is in this embodiment mounted fixedly on the body 3, but can also be removably mounted so that the brush member 4 can be replaced with a new one when the bristles 6 are worn out. The tooth brush 2 furthermore comprises an additive container 8

connected with said additive outlet 7, which container in this embodiment is provided partly within the body 3 and partly protrudes from the circumferential surface of the body 3. The tooth brush 2 furthermore comprises driving means 9 for generating sonic frequency vibrations and transmission means 29 for transmitting said sonic frequency vibrations to the brush head 5. These driving and transmission means are shown schematically in Figure 1, and can comprise driving and transmission means as described for example in EP 0565598 B1. The driving means 9 can comprise drive electronics such as a power supply, an oscillator, an amplifier and a transformer, but can also comprise any other known type of driving means capable of generating sonic frequency vibrations. In this embodiment the power supply of the tooth brush 2 comprises rechargeable batteries, not shown in the Figure, which can be electrically charged in a charging holder the tooth brush is placed in after a certain period of use. In this embodiment the body 3 is further provided with an on/off button 10 to activate and de-activate the driving means 9.

As can be seen in Figure 2, the tooth brush 2 comprises a further additive container 18 next to additive container 8, which containers both are in connection with the additive outlet 7 formed by openings 7' in the brush head 5. The containers are connected to these openings 7' via a pump unit 13 and transport channels 14 and 24 respectively. The first container 8 can contain a certain type of additive, and the further container 18 can contain another type of additive. During operation a subsequent first and second additive flow from respectively the first and the second container 8 and 18 via the pump unit 13 and the transport channels 14 and 24 to the additive outlet 7 take place. Thus the tooth brush 2 applies two different additives to the teeth during operation, without the user having to manually apply these additives to the brush head 5 of the tooth brush first. As can be seen in Figure 1, the tooth brush 2 is provided with means 11 for selection of the first and the second additive flow, in this embodiment a switch 21 positionable from a neutral position in a first and a second position corresponding to the first and the second additive flow. The pump unit 13 in this embodiment comprises an electrically driven pump, which is activated by a processor 19. The processor activates the pump unit 13 to pump from one of the containers, based on the input from this switch 21 when the driving means 9 are activated by means of the on/off button 10. It is furthermore possible that the switch 21 is omitted and that, when the driving means 9 are activated by means of on/off button 10, the processor 19 starts to control the additive flow from the first and the second container in a certain order and with certain amounts. The user only has to activate the tooth brush by pushing the on/off button 10, and

the processor takes care of the additive supply. This adds to the user-friendliness of the tooth brush and makes it especially suitable for elder people and children.

It is observed that the pump unit 13 in the tooth brush can also be manually driven by the user pushing a pump button which is provided on the body of the tooth brush next to the on/off button. It is also possible that for example a first additive is manually pumped to the brush head 5 by the user by means of the pump button, and the processor controls a further transport of a second additive to the brush head 5 after a certain period of time has passed. Furthermore it is possible to only apply sonic frequency vibrations during one of the additive flows, while the other additive is applied without sonic frequency vibrations .

It is advantageous when the first additive flow comprises transport of a cleaning additive from the first container 8 to the additive outlet 7, and the second additive flow comprises transport of an additive chosen from a group of additives for treatment and protection of the oral cavity and teeth, from the second container 18 to the additive outlet 7.

In the embodiment of Figure 1 and 2, the first and the second additive flow comprise transport of additives having respectively a cleaning and treating effect on the teeth and the oral cavity, and are divided in a day and night phase. In this embodiment the body 3 of the tooth brush 2 is provided with symbols next to the switch 21 indicating the day and night phase respectively. The day phase in this embodiment comprises the application of a cleaning additive, here formed by a gel, to the teeth during operation of the tooth brush. This phase is activated during the tooth brushing action of a user in the morning. The sonic frequency vibrations of the tooth brush enhance the cleaning effect of the cleaning gel. The night phase in this embodiment comprises the application of a revitalizing gel to the teeth during operation of the tooth brush. This phase is activated during the tooth brushing action of a user in the evening before going to sleep. The gel forms a coating on the teeth which treats the teeth during sleep of the user. The first and second additive flow can also comprise, in stead of a day phase and a night phase, a cleaning phase and a treating phase which occur within one use of the toothbrush, contrary to the embodiment with the day and night phases which are related to respectively the morning and the evening tooth brushing by a user. The treating phase can comprise the application of the revitalizing gel as described before, or the application of for example a fluoride mineral for protection of the teeth.

The first and the second additive flow can furthermore take place simultaneously during operation. This is advantageous when certain additives cannot be stored within one container because of a chemical reaction between them which reaction is

unwanted during storage. In combination with each other however, these additives have a beneficial effect on the teeth and oral cavity because of this chemical reaction. The first and second container 8, 18 each can contain one of these additives. The processor 19 is able to activate the pump unit 13 to pump from both additive containers simultaneously and the additives are then transported via transport channels 14 and 24 respectively to the brush head 5 of the tooth brush 2. The additives come together during application to the teeth when the additives leave their respective openings forming the additive outlet 7. Thus the chemical reaction between the additives can have its beneficial effect on the teeth and oral cavity, while mixture and reach of the additives is enhanced by the sonic frequency vibrations. In the embodiment as described here, the construction of the tooth brush makes both sequential and simultaneous application of varying additives possible. A tooth brush only capable of simultaneous application is another possibility which can be realised when transport channels 14 and 24 are combined into one transport channel.

The containers 8 and 18 in this embodiment are disposable containers removably mounted on the body of the tooth brush. The containers can also comprise permanent containers which are to be removed for separate refill. Furthermore at least one of the containers can be fixedly mounted on or in the body 3 and can be refilled with additive. This will be further elucidated in the following.

Figure 3 shows a second embodiment of an oral care system 1' comprising a sonic tooth brush 2' according to the invention. The system 1' comprises a charging holder 15 in which the toothbrush 2' can be placed for electrical charging of its rechargeable batteries, which holder 15 is provided with a refill unit 16 for refilling at least one of the containers 8', 18' when the toothbrush 2' is placed in the holder. Said refill unit 16 comprises at least one tank 26 connected with a refill pump unit 23, which refill pump unit 23 is connectable via a coupling 25 in the tooth brush 2' to at least one of the containers 8', 18' when the toothbrush 2' is placed in the holder. The container can thus be refilled after a period of use when the tooth brush 2' is placed in the holder 15 for recharging.

It is noted that the refill unit for refilling an additive container as described hereinbefore is also advantageously applicable with other types of tooth brushes. These tooth brushes can comprise for example different driving means, and can be power tooth brushes not using sonic frequency vibrations or even non-electrically driven tooth brushes. With non-electrical tooth brushes the holder would be a specific holder performing a storage and refill function instead of a charging holder, since no batteries have to be charged. The refill unit is also advantageously usable with tooth brushes which comprise only one additive container.

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The refilling of the at least one container can be electrically driven, or can be manually driven by a user performing a pumping action by means of for example a button.

It is observed that the tooth brush can also comprise more than two containers.

5 In this manner the tooth brush is able to apply even more types of additives to the teeth and oral cavity during operation. Next to enhancing the brushing action of the tooth brush by means of varying additives, it is also possible to add for example a spraying function to the tooth brush. The additive to be sprayed is then contained in a further container within the tooth brush. In addition it is also possible that the refill unit 16 comprises two or more tanks and two or more couplings, for refilling the containers.

10 It is furthermore observed that the oral care system can comprise, next to the sonic power tooth brush or in stead of this tooth brush, other oral care devices such as a water syringe device which comprise at least two additive containers. Such a water syringe device comprising at least two additive containers offers the possibility of applying varying additives to the oral cavity such as for example first a cleaning additive followed by a  
15 refreshing additive. The advantages of at least two additive containers in an oral care system as mentioned hereinbefore also apply when these containers are provided in an oral care device such as water syringe device.

## CLAIMS:

1. An oral care system (1) comprising a sonic power toothbrush (2) which comprises:

- a body (3);
- a brush member (4) mounted on the body (3);
- 5 - a brush head (5) which is carried by the brush member (4) at its end remote from the body (3) so as to be able to vibrate relative to the body (3), which brush head is provided with bristles (6) and an additive outlet (7);
- an additive container (8) connected with said additive outlet (7);
- driving means (9) for generating sonic frequency vibrations and transmission
- 10 means (29) for transmitting said sonic frequency vibrations to the brush head (5);

characterized in that the tooth brush (2) comprises at least one further additive container (18).

2. An oral care system as claimed in Claim 1, characterized in that the tooth  
15 brush (2) is provided with means (11) for selection of a first and a second additive flow from respectively the first and the second additive container (8, 18).

3. An oral care system as claimed in Claim 2, characterized in that the means  
20 (11) comprise a switch (21) positionable in a first and a second position corresponding to the first and the second additive flow.

4. An oral care system as claimed in Claim 1, characterized in that the system (1) comprises a processor (19) for selecting and activating additive flows in the tooth brush (2).

25 5. An oral care system as claimed in Claim 1, characterized in that the system (1') comprises a charging holder (15) in which the toothbrush (2') can be placed for electrical charging, which holder (15) is provided with a refill unit (16) for refilling at least one of the containers (8', 18') when the toothbrush (2') is placed in the holder (15).

6. An oral care system as claimed in Claim 5, characterized in that the refill unit (16) comprises at least one tank (26) connected with a refill pump unit (23), which pump unit (23) is connectable via a coupling (25) in the tooth brush (2') to at least one of the containers (8', 18') when the toothbrush (2') is placed in the holder (15).

**ABSTRACT:**

An oral care system (1) comprising a sonic power toothbrush (2) which comprises a body (3), a brush member (4) mounted on the body (3), a brush head (5) which is carried by the brush member (4) at its end remote from the body (3) so as to be able to vibrate relative to the body (3), which brush head is provided with bristles (6) and an additive outlet (7), an additive container (8) connected with said additive outlet (7), driving means (9) for generating sonic frequency vibrations and transmission means (29) for transmitting said sonic frequency vibrations to the brush head (5), wherein the tooth brush (2) comprises at least one further additive container (18). In stead of the user having to apply a first and a second additive manually to the brush head (5), these additives are already incorporated into the sonic power toothbrush (2) which benefits the user friendliness of the device. The application of the additives to the teeth is realised in an effective manner, while the sonic frequency vibrations enhance the effect of the additives.

Fig. 1





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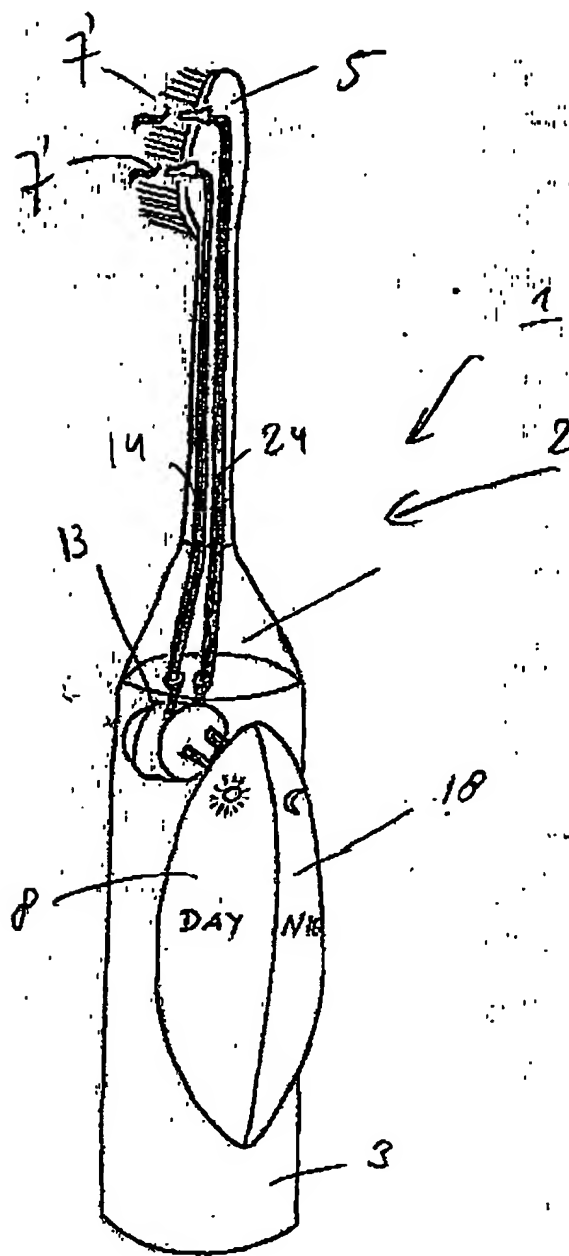


FIG. 2

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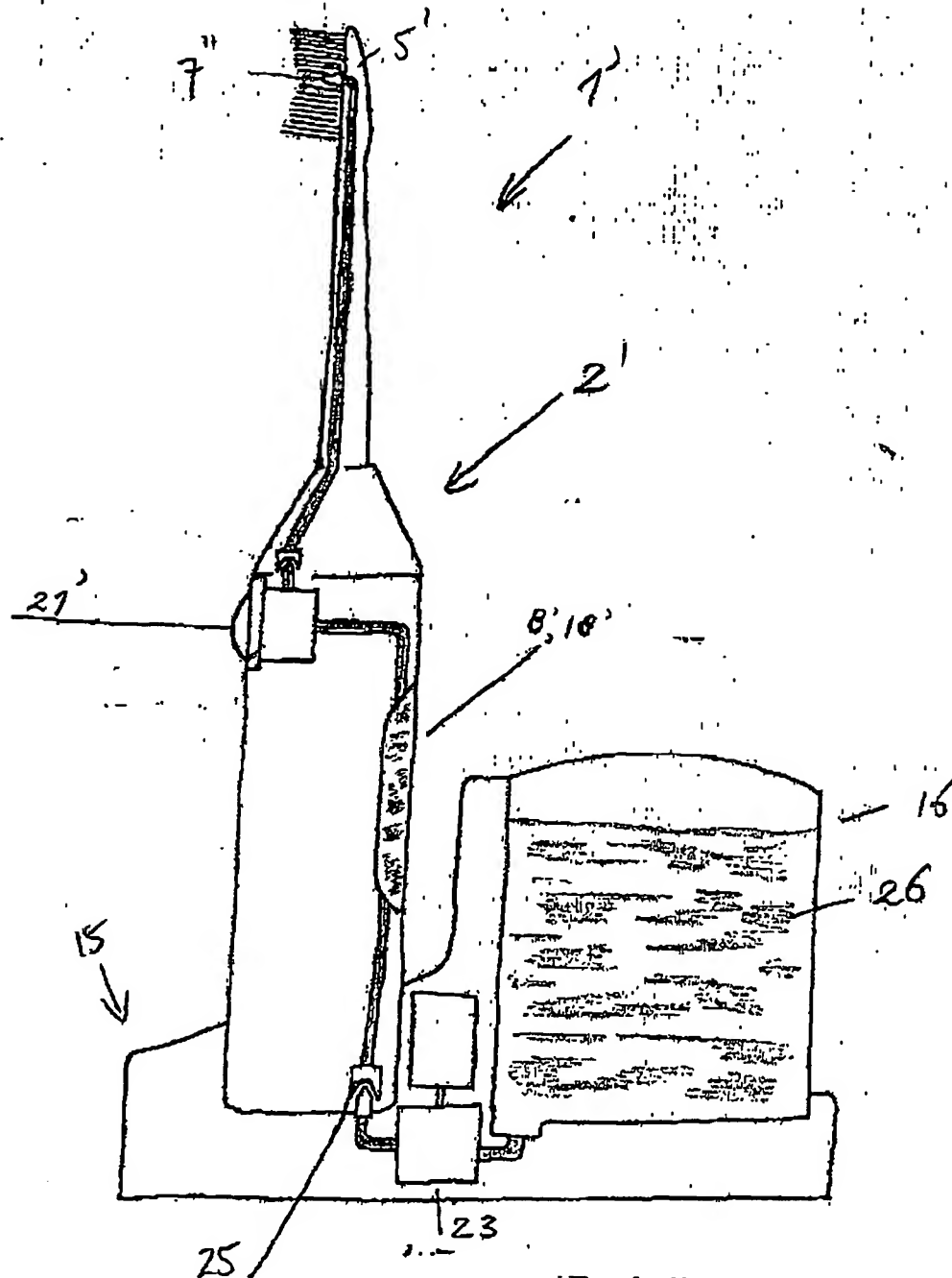


FIG. 3

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